Optimal Portfolio Based Risk and Return of Corporate Sukuk in Indonesia

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Abstract

This study aims to analyze the optimal portfolio of corporate sukuk in Indonesia using the risk return analysis approach and the CML (Capital Market Line) model in order to foster investor interest in investing in corporate sukuk instruments. This research was conducted using data throughout 2014 – 2018 and is divided into three measurement periods, namely the crisis period (2014-2016), post-crisis (2016-2018) and long-term (2014-2018), each period representing Indonesia's economic condition. and globally. The results showed that during the crisis period, sukuk with ijarah were superior both in risk and return compared to mudharabah, so that the optimal portfolio composition was to maximize the composition of ijarah. However, in the post-crisis period (improvement of economic conditions) and long-term measurements, the composition of the existing portfolio is more varied depending on the goals of each investor, either to maximize returns or to minimize risk. However, in the post-crisis period (improvement of economic conditions) and long-term measurements, the composition of the existing portfolio is more varied depending on the goals of each investor, either to maximize returns or to minimize risk. The optimal portfolio combination (referring to the benchmark rate) between sukuk mudharabah and sukuk ijarah is 0% mudharabah: 100% ijarah for the period 2014 – 2016 with a return rate of 3.9 and a risk of 0.49, 81% mudharabah : 19% ijarah for the period 2016 – 2018 with a return rate of 2.71 and a risk of 0.65, and 85% mudharabah: 15% ijarah for the period 2014 – 2018 with a return rate of 2.77 and a risk of 0.79. This combination can form an efficient frontier that provides a comparison of the same level of return and risk.

I. Introduction

The concept of sharia-based finance is currently growing rapidly. Globally, its assets until the beginning of 2018 had reached USD 2.4 trillion (IFSB, 2018) or grew 7% from the previous year, which was USD 2.2 trillion. Even in the coming years it is estimated to grow to reach 4 trillion USD. Likewise in Indonesia, where currently the total total of Islamic financial assets reaches USD 82 billion (OJK, 2018) or occupies the 8th position in the country with the largest Islamic assets. This development is formed from several aspects such as business volume, financial products and also the financial sector (Ismal, 2014). One of the Islamic financial instruments that contribute to the growth of Islamic financial assets in Indonesia is the sukuk or sharia bond.

Corporate sukuk is one of the most widely used sharia-based financial instruments in the world. In Indonesia, since the issuance of the first corporate sukuk in 2002 until the end

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of 2018, corporate sukuk continued to experience growth, where during 2014 – 2018 the average corporate sukuk grew by 31% (IBPA, 2018). However, despite good growth, the corporate sukuk market in Indonesia is still very small compared to state sukuk and corporate bonds. Of the total Rp 666.35 trillion total accumulated national sukuk issuance, Rp 645.05 trillion or 96% was issued by the government represented by the Ministry of Finance of the Republic of Indonesia in the form of State Sharia Securities, while corporate sukuk only accounted for 3% or Rp 21 trillion of the total. total accumulated national sukuk emissions (OJK, 2018). Then when compared to corporate bonds, the *market share* of corporate sukuk in the national corporate debt market is also still very small. It can be seen that until December 2017 the *market share* of corporate sukuk to the national corporate debt market only reached 13% (IBPA, 2018).

The low issuance of corporate sukuk when compared to state sukuk and corporate bonds is caused by several factors, including aspects of market players consisting of issuers and investors, *opportunity costs*, liquidity aspects, to regulations or legislation (Endri, 2009). Meanwhile, according to Dewi (2011), common problems with the development of sukuk include: (1) the limited number of issuances so that trading in the secondary market is not active; (2) the behavior of investors who tend to be *risk averse* and carry out a *buy and hold strategy*.

What is evidence that the majority of investors who invest in corporate sukuk behave *risk averse* is that sukuk with *ijarah* sukuk *mudharabah*, namely out of a total of 85 corporate sukuk issuers listed on the IDX, the proportion *ijarah* is 78% of the total emissions. corporate sukuk, while *mudharabah* are only 22% (OJK, 2018). Conditions when sukuk *ijarah* are more desirable than sukuk *mudharabah* due to the fixed return on investment for sukuk *Burhanuddin* ijarah (2013). *Fixed return* on *ijarah* reflects the certainty of investment returns that will be received on a regular basis so that this sukuk is preferred by investors.

Another factor that causes the lack of interest in *mudharabah* is because the majority of sukuk investors in investing still behave rationally and pay close attention to technical aspects such as accounting information in the form of returns, risks and secondary market conditions of these investment instruments. Meanwhile, the fundamental aspects such as the type of contract used and the conformity of sharia are rarely considered by sukuk investors (Aziz, 2013). This is also in line with research conducted by Malik (2017) which states that Islamic investors in investing in Islamic financial instruments, their preferences are strongly influenced by risk factors and the income to be obtained.

Every investor who invests funds in the capital market generally considers several aspects, namely the level of return (*return*), the level of risk (*risk*) and the form of the relationship between *risk* and *return* (Devjak, 2004). One of the characteristics of securities is the ease of forming a combination or investment portfolio, meaning that investors can easily diversify their investments on various opportunities and types of investment instruments. This is done with the consideration that if doing a combination of types of investment is expected to optimize the rate of *return* and can minimize risk (Manurung, 2010).

Therefore, it is necessary to analyze the *risk* and *return* of the *mudharabah* and *ijarah* to determine the instrument that provides the optimal level of profit with an acceptable level of risk.

The objectives of this study are (1) to analyze the *risk* and *return* of corporate sukuk with *mudharabah* and *ijarah* (2) analyze the optimal portfolio combination of corporate sukuk in Indonesia (3) formulate optimal portfolio formation strategies that can be useful for investor decision making in investing in corporate sukuk in Indonesia

II. Research Method

2.1 Portfolio Theory

Portfolio is a collection of investments that involves identifying which financial instruments to choose and determining the proportion of funds invested in each of these instruments (Husnan, 2014). According to Widoatmojo (2005), portfolio can be defined as an activity to invest in various investment instruments, it can be similar or it can be dissimilar, the purpose of which is to reduce risk and generate income in accordance with the objectives.

2.2 Risk and Return Portfolio

Theory is return used to analyze the rate of return of each instrument, expected return, probability and market risk. This theory also detects the risk of each investment instrument through the level of variation of the actual and expected returns. Estimating return and risk of a portfolio means calculating return from the risk of a collection of individual assets combined in a portfolio of assets. The definition of a portfolio refers to a collection of financial assets that is used as a means of investing. In this theory there is an assumption that investors are risk averse (avoiding risk). Rational investors will seek to obtain financial assets that are able to provide the maximum return with the smallest risk (Bodie et al., 2014).
Efficient

Portfolio A portfolio is said to be efficient if the portfolio when compared with other portfolios meets the following conditions:
a. Provides expected return with the same risk, or
b. Provides the smallest risk with expected return.

In determining an efficient portfolio, it is assumed that the behavior of all investors is risk averse.

2.3 Optimal

Portfolio An optimal portfolio is a portfolio that is chosen by investors from the many choices available in an efficient portfolio collection (Tandelilin, 2010). The portfolio chosen by the investor is a portfolio that is in accordance with the investor's preferences or what we know as the investor's utility curve for the return and the risk he is willing to bear.

Markowitz Portfolio Theory Portfolio is a collection of assets that are invested by buying shares of companies operating in various types of industries, so that the portfolio will reduce investment risk (Jones, 2014). Portfolio can be defined as a collection of assets to be invested with the aim of obtaining an optimal allocation of different assets, so as to minimize the risk of the expected return.

2.4 Markowitz Model Optimal Portfolio Theory – Tobin

Tobin (1958) introduced risk-free assets into the Markowitz model. Risk free asset is an asset whose future rate of return can be ascertained at this time, and is indicated by a return equal to zero. Tobin's theory states that if there is one asset or instrument that is riskless/risk free then all investors who have a risk averse direct their investment portfolios to follow the return of the risk-free asset/instrument, the return this risk-free instrument is called the Capital Market Line (CML).

III. Research Method

This study uses a quantitative descriptive approach and is a scientific approach that can be used in policy determination (Render *et al*., 2012). Descriptive analysis is carried out for exploration and clarification of a social phenomenon by providing a description or description of a number of variables related to the problem and research unit. Objective quantitative analysis is carried out by describing social phenomena into several problem components, variables and indicators. The quantitative analysis used in this study is the *mean-variance* introduced by Markowitz (1952) in portfolio selection theory.

IV. Result and Discussion

4.1 Data Description

In this study, the sukuk used as a sample to form the optimal portfolio are corporate sukuk which are listed on the Indonesia Stock Exchange and have a data *rate of return* or yield of 60 data sets in the period January 2014 to December 2018. Profile of corporate sukuk the samples used in this study are presented in the following table:

Table 1. Description of sukuk data

No.	Code of Sukuk	Issuing Company	Contract	Number of Months	Industry Category
1	ADHISM1CN2	Adhi Karya	*Mudharabah*	60	Construction
2	BBMISMSB1CN2	BMI	*Mudharabah*	60	Banking
3	SIISAT05	Indosat	*Ijarah*	60	Telecommunications
4	SIPPLN01CN1	PLN	*Ijarah*	60	Energy

Source: Financial Services Authority, 2018

These four sukuk were chosen with the following considerations: (1) representing the types of contracts, both *ijarah* and *mudharabah*, where from these four sukuk data, there are two sukuk with *mudharabah* and two sukuk with *ijarah* (2) represents the type of industry, in which the sukuk are selected consisting of the construction, banking, telecommunications and energy industries (3) continuity of issuance, these four sukuk issuing companies are companies that routinely issue corporate sukuk, (4) the emission value is quite high, considering that these four companies frequently issue sukuk, The accumulation of sukuk issuance of these four companies is one of the highest when compared to other companies. (5) The growth of emission value, the growth of emission value of these four companies is also quite high when compared to other companies.

4.2 Profile of Corporate Sukuk Yield

Source: IBPA, 2018 (processed by the author)
Figure 1. *Rate of return corporate sukuk*

The yield profile of each sukuk is described in Figure 1. In Figure 1 you can see the trend of yields on corporate sukuk that were sampled throughout the January period 2014 – Desember 2018. The yield trend of the four sukuk generally fluctuates every year and has almost the same pattern, where the *return* occurred in the period September 2015 which is the company's response to the impact of the *quantitative easing* in 2014 – 2015 which caused an economic slowdown and increase in interest rates. In detail, sukuk with the code ADHISM1CN2 obtained a return in the period September 2015 of 12.3 and the lowest in December 2018 of 5.67 with an average *return* of 10.52. Sukuk with the code BBMISMSB1CN2 obtained a return in June 2014 of 12.35 and the lowest in January 2018 of 8.98 with an average *return* of 11.34. Sukuk with code SIISAT05 obtained a return in the period September 2015 of 11.21 and the lowest in January 2018 of 6.75 with an average *return* of 9.75. Meanwhile, sukuk with the code SIPPLN01CN1 obtained a return in the September 2015 period of 11.33 and the lowest in January 2018 of 7.09 with an average *return*9.79.

4.3 Measurement Return and Risk of Each Sukuk

The measurement *returns* and *risk* was carried out in several periods throughout 2014 – 2018. The periods to be analyzed are (1) the crisis period (2014 - 2016) (2) the post-crisis period (2016 - 2018) (3) long-term period (2014 – 2018) with the aim of looking at the characteristics of the portfolio that should be taken by investors in response to changes in financial conditions and differences in the investment period, namely in the long term or short term.

The first step is to calculate the *probability of occurrence*. The *probability of occurrence* is used to determine the expected return or *expected return* of an instrument. By completing equation 1, the *probability of occurrence* of each sukuk is obtained in each measurement time period as in Table 2.

Table 2. *Probability of occurrence of* corporate sukuk

SUKUK CODE	2014 - 2016		2016 - 2018		2014 - 2018	
	Interval	Peluang	Interval	Peluang	Interval	Peluang
ADHISM1CN2	x<10.18	36%	x<7.01	28%	x<7.32	18%
	10.18<x<10.88	39%	7.01<x<8.36	25%	7.32<x<8.98	20%
	10.88<x<11.59	22%	8.36<x<9.71	22%	8.98<x<10.64	37%
	x>11.59	3%	x>9.71	25%	x>10.64	25%
BBMISMSB1CN2	x<10.57	14%	x<9.7	19%	x<9.82	17%
	10.57<x<11.16	28%	9.7<x<10.42	31%	9.82<x<10.66	28%
	11.16<x<11.75	31%	10.42<x<11.14	33%	10.66<x<11.5	30%
	x>11.75	28%	x>11.14	17%	x>11.5	25%
SIISAT05	x<8.99	11%	x<7.53	22%	x<7.86	20%
	8.99<x<9.73	28%	7.53<x<8.32	42%	7.86<x<8.97	27%
	9.73<x<10.47	53%	8.32<x<9.11	19%	8.97<x<10.09	33%
	x>10.47	8%	x>9.11	17%	x>10.09	20%
SIPPLN01CN1	x<9.23	28%	x<7.81	19%	x<8.14	18%
	9.23<x<9.92	14%	7.81<x<8.53	33%	8.14<x<9.2	37%
	9.92<x<10.62	56%	8.53<x<9.25	36%	9.2<x<10.26	32%
	x>10.62	3%	x>9.25	11%	x>10.26	13%

Source: IBPA, 2018 (processed by the author)

In Table 2, it is known that the yield for sukuk with the code ADHISM1CN2 for 3 consecutive measurement periods is in the range of 10.18% – 11.59% in the period 2014 – 2016, 7.01% - 9.71% in the period 2016 – 2018, and 7.32 – 10.64 in the period 2014 – 2018. *BBMISMSB1CN2* for 3 consecutive time periods are in the range of 10.57% – 11.75% in the period 2014 – 2016, 9.7% - 11.14% in the period 2016 – 2018, and 9.82% - 11.50% in the period 2014 – 2018. *Sukuk* returns with SIISAT05 code for 3 time periods in a row in the range of 8.99% – 10.47% in the period 2014 – 2016, 7.53% - 9.11% in the period 2016 – 2018, and 7.86% - 10.09% in the period 2014 – 2018. While the *return* sukuk with code SIPPLN01CN1 for 3 consecutive time periods are in the range of 9.23% – 10.62% in the period 2014 – 2016, 7.81% - 9.25% in the period 2016 – 2018, and 8.14% - 10.26% in the period 2014 – 2018. The highest rates for these four sukuk occurred in the 2014 – 2016 period. This was done by the issuing company in response to the economic slowdown that occurred during 2014 – 2016.

4.4 Mapping Expected Return and Risk of Each Sukuk

By solving equations 2, 3 and 4, it is obtained to obtain return data on expected variance and standard deviation of each instrument, which are further described in Table 3. In the period 2014 – 2016 sukuk with the code SIPPLN01CN1 had *expected return* of 4.03 and had a standard deviation of 3.31. In the period 2016 – 2018 sukuk with code BBMISMSB1CN2 have *expected return* of 2.80 and have a standard deviation of 3.87, while in the period 2014 – 2018 sukuk with code BBMISMSB1CN2 again have *expected return* of 2.8 and have a standard deviation of 4.1.

In the period 2014 – 2016 sukuk with the code SIPPLN01CN1 had *expected return* of 4.03 and had a standard deviation of 3.31. In the period 2016 – 2018 sukuk with code BBMISMSB1CN2 have *expected return* of 2.80 and have a standard deviation of 3.87, while in the period 2014 – 2018 sukuk with code BBMISMSB1CN2 again have *expected return* of 2.8 and have a standard deviation of 4.1.

Table 3. Recap of *risk-return* sukuk

	2014-2016			2016-2018			2014-2018		
	ER	VAR	STDV	ER	VAR	STDV	ER	VAR	STDV
ADHISM1CN2	3.45	15.40	3.92	2.05	9.82	3.13	2.6	12.4	3.5
BBMISMSB1C N2	3.05	18.18	4.26	2.80	14.94	3.87	2.8	16.6	4.1
SIISAT05	3.71	11.19	3.34	2.32	8.81	2.97	2.4	3.43 1	2.4
SIPP L	3.431	10.95	_	_	_	_	_	13.6	2.97

10.95: data processed by the author

In the period 2014 – 2016 sukuk with code SIPPLN01CN1 has *expected return* of 4.03 and has a standard deviation of 3.31. In the period 2016 – 2018 sukuk with code BBMISMSB1CN2 have *expected return* of 2.80 and have a standard deviation of 3.87, while in the period 2014 – 2018 sukuk with code BBMISMSB1CN2 again have *expected return* of 2.8 and have a standard deviation of 4.1.

In addition, from this data it is also known that during the three calculation periods, both the crisis period (2014 - 2016), the post-crisis period (2016 - 2018), and long-term measurements, sukuk with *mudharabah* have a higher level of risk compared to sukuk with *ijarah*. However, in terms of *returns*, sukuk with *ijarah* do not always have a lower *mudharabah*. Where it can be seen that during the crisis period, sukuk with *ijarah* provide higher expected returns compared to *mudharabah*, while in the post-crisis period and the long-term measurement period, sukuk with *mudharabah* provide *returns* higher *ijarah*, this is means that for crisis conditions, the preferred sukuk are sukuk with *ijarah* because they provide *return*, while in long-term investment, sukuk with *mudharabah* provide *returns* than *ijarah*. In general, the mapping of the returns and risks of the four sukuk throughout 2014 – 2018 can be illustrated in Figure 2.
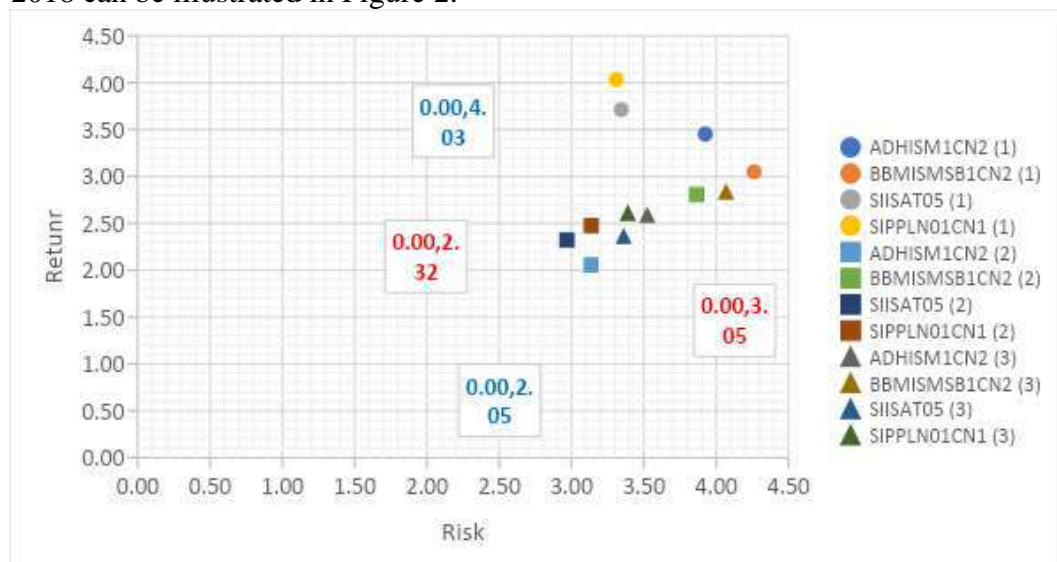
Source: data processed by the author
Figure 2. *Mapping the risk-return of corporate sukuk*

In Figure 2, it is known that the sukuk with *return* are the sukuk with the code SIPPLN01CN1 in the period 2014 – 2016 (3.31, 4.03) and the sukuk with *return* are the

sukuk with the code ADHISM1CN2 in the period 2016 – 2018 (3.13, 2.05). Meanwhile, the sukuk with the highest risk are the sukuk with the code BBMISMSB1CN2 in the period 2014 – 2016 (4.26, 3.05) and the sukuk with the lowest risk are the sukuk with the SIISAT code in the period 2014 – 2016 (2.07, 2.32).

4.5 Investment Portfolio

Analysis Analysis of portfolio formation is carried out by simultaneously combining the Markowitz model and the Markowitz-Tobin model and evaluating the portfolio formed using the Sharpe index. In addition, the analysis will also be carried out in several periods throughout 2014 – 2018, where the periods to be analyzed are (1) the crisis period (2014 - 2016) (2) the post-crisis period (2016 - 2018) (3) the long-term period (2014). – 2018) with the aim of looking at the characteristics of the portfolio that should be taken by investors in response to changes in financial conditions and differences in the investment period, namely in the long term or short term. By solving equations 5 – 19, we get a portfolio combination that will generate *return* , minimal risk and also the optimal point which is the reference for *the benchmark rate* , in this case State Sharia Securities (SBSN)

4.6 Crisis Period Portfolio (2014 – 2016)

Table 4. Sukuk investment portfolio corporate crisis period (2014 – 2016)

	Crisis Period (2014 – 2016)		
	Optimal	Max ER	Min Stdv
ADHISM1CN2	0%	0%	0%
BBMISMSB1CN2	0%	0%	0%
SIISAT05	44%	0%	48%
SIPPLN01CN1	56%	100%	52%
M:I	0%:100%	0%:100%	0%:100 %
Return	3.90	4.03	3.88
Risk	0.48	0.66	0.48
Rf	2.38	2.38	2.38
Sharpe Ratio	3.16	2.49	3.14

Source: data processed by the author

Table 4 describes the Corporate Sukuk Investment Portfolio for the Crisis Period (2014 – 2016). Where during the crisis period or throughout 2014 - 2016, the optimal portfolio (at *return* of 3.89 and a risk of 0.49 (standard deviation) with an SR of 3.16, where this portfolio consists of 0% *mudharabah* and 100% *ijarah* (44% SIISAT05 and 56% SIPPLN01CN1)

The portfolio that produces the *return* (*Max Return*) is at *return* 4.03 and risk is 0.66 (standard deviation) with an SR of 2.49, where this portfolio consists of 0% *mudharabah* and 100% sukuk *ijarah* (100% SIPPLN01CN1) The portfolio that produces the lowest level of risk is at *return* of 3.88 and a risk of 0.48 (standard deviation) with an SR of 3.14, where this portfolio consists of 0% *mudharabah* and 100% *ijarah* (48% SIISAT05 and 52% SIPPLN01CN1)

All portfolio combinations in the 2014 – 2016 measurement period resulted in an optimal portfolio with a percentage of 0% *mudharabah* and 100% *ijarah*. The sukuk crisis period that is more suitable to buy is a sukuk with an *ijarah*, because it provides a less volatile rate of return. In detail about the portfolio generated during this crisis period, it can be seen in Table 4

4.7 Normal Period Portfolio (2016 – 2018)

During the post-crisis period or throughout 2016 - 2018, the optimal portfolio is at *return* of 2.71 and a risk of 0.65 (standard deviation) with The SR is 1.93, in which this portfolio consists of 81% *mudharabah* (100% BBMISMSB1CN2) and 19% *ijarah* (100% SIISAT05). The portfolio that generates the highest rate *return* (*max return*) is at *return* of 2.80 and a risk of 0.77 (standard deviation) with an SR of 1.73, where this portfolio consists of 100% *mudharabah* (100% BBMISMSB1CN2) and 0% *ijarah*. The portfolio that produces the lowest risk level is at *return* of 2.57 and a risk of 0.56 (standard deviation) with an SR of 1.99, where this portfolio consists of 52% *mudharabah* (100% BBMISMSB1CN2) and 48% *ijarah* (100% SIISAT05).

During the post-crisis period or throughout 2016 – 2018, the optimal portfolio is at *return* of 2.71 and a risk of 0.65 (standard deviation) with an SR of 1.93, where this portfolio consists of 81% *mudharabah* (100% BBMISMSB1CN2) and 19% sukuk *ijarah* (100% SIISAT05). The portfolio that generates the highest rate *return* (*max return*) is at *return* of 2.80 and a risk of 0.77 (standard deviation) with an SR of 1.73, where this portfolio consists of 100% *mudharabah* (100% *BBMISMSB1CN2*) and 0% *ijarah*. The portfolio that produces the lowest level of risk is at *return* of 2.57 and a risk of 0.56 (standard deviation) with an SR of 1.99, in which this portfolio consists of 52% *mudharabah* (100% BBMISMSB1CN2) and 48% *ijarah* (100% SIISAT05).

Table 5. Corporate sukuk investment portfolio for the normal period (2016 – 2018) for

	the normal period (2016-2018)		
	Optimal	Max ER	Min Stdv
ADHISM1CN2	0%	0%	0%
BBMISMSB1CN2	81%	100%	52%
SIISAT05	19%	0%	48%
SIPPLN01CN1	0%	0%	0%
M:I	81%:19%	100%:0%	52%:48%
Return	2.71	2.80	2.57
Risk	0.65	0.77	0.56
Rf	1.46	1.46	1.46
Sharpe Ratio	1.93	1.73	1.99

Source: data processed by the author

In this post-crisis period, the optimal portfolio combination is more varied with the combination of sukuk *mudharabah* and *ijarah*. This is because during this period economic conditions began to gradually improve so that investment decisions were also more varied.

4.8 Long-Term Measurement Portfolio (2014 – 2018)

During the long-term period or throughout 2014 - 2018, the optimal portfolio is at *return* of 2.77 and a risk of 0.79 (standard deviation) with an SR of 0.76, where this portfolio consists of 85% *mudharabah* (100% BBMISMSB1CN2) and 15% sukuk *ijarah* (100% SIISAT05).

Table 6. Long-term corporate sukuk investment portfolio – source: data processed by the author

|	2014-2018		
	Optimal	Max ER	Min Stdv
ADHISM1CN2	0%	0%	0%
BBMISMSB1CN2	85%	100%	49%
SIISAT05	15%	0%	36%
SIPPLN01CN1	0%	0%	15%
M:I	85%:15%	100%:0%	49%:51%
Return	2.77	2.83	2.63
Risk	0.79	0.90	0.71
Rf	2.16	2.16	2.16
Sharpe Ratio	0.76	0.75	0.66

The portfolio that produces the *return* (*max return*) is at *return* 2.83 and risk is 0.90 (standard deviation) with an SR of 0.75, where this portfolio consists of sukuk *mudharabah* (100% BBMISMSB1CN2) and 0% *ijarah*. The portfolio that produces the lowest level of risk is at *return* of 2.63 and a risk of 0.71 (standard deviation) with an SR of 0.66, in which this portfolio consists of 49% *mudharabah* (100% BBMISMSB1CN2) and 51% *ijarah* (71% SIISAT05 and 29% SIPPLN01CN1).

Similar to the post-crisis period, the optimal portfolio combination in the long term is more varied with the combination of sukuk *mudharabah* and *ijarah*. This is because during this period economic conditions began to gradually improve so that investment decisions were also more varied.

### 4.8 Optimal Portfolio Analysis

Portfolios will be created *efficiently* which lies on the *efficient frontier*, where each investor can choose one portfolio that is considered optimal in the portfolio set according to their preferences. -each. The basis for the formation of the *efficient frontier* is from the optimal portfolio in each measurement period. The following are the results of the formation of the *efficient frontier* in each measurement period.

Figure 3 illustrates all the optimal combinations of portfolios that can be taken during the crisis period starting from point A to point C. The combination of portfolios that are along the line from point B to point C has the same level of risk as the portfolio that is along the line from point A up to point B, but has a higher yield. So that the combination of portfolios that are along the line from point B to point C is the optimal portfolio combination, because it provides higher returns at the same level of risk compared to portfolios that are along the line from point A to point B. The optimal portfolio crisis is along point B which has a *return* of 3.71 with a standard deviation of 0.54 and point C which produces the *return* of 3.90 with a standard deviation of 0.48.
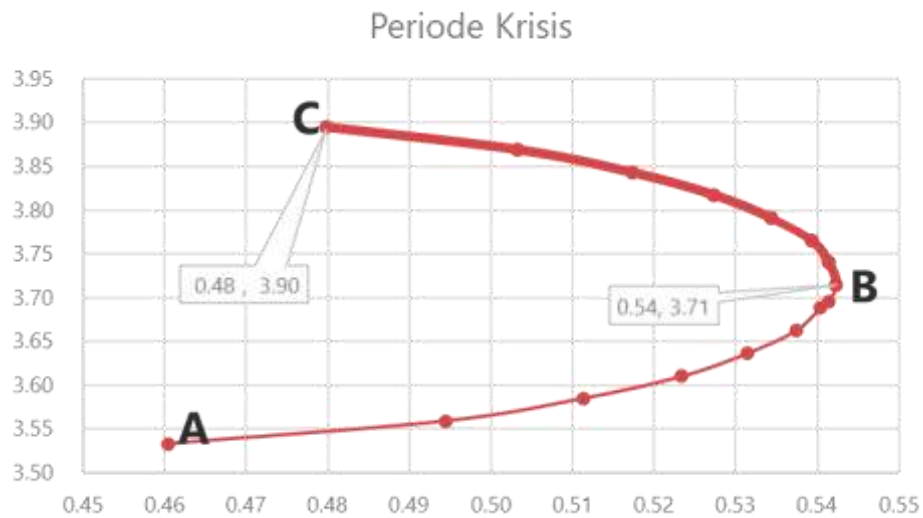
***Figure 3.** Efficient portfolio frontier corporate sukuk during the crisis period*
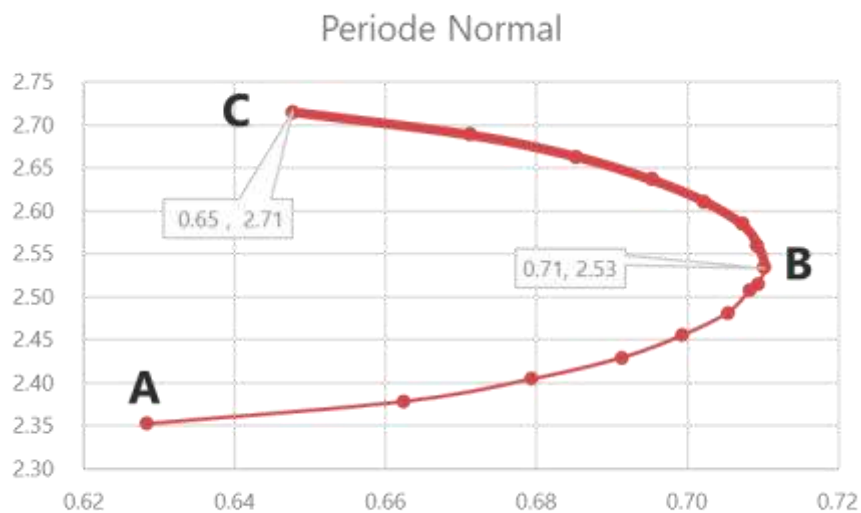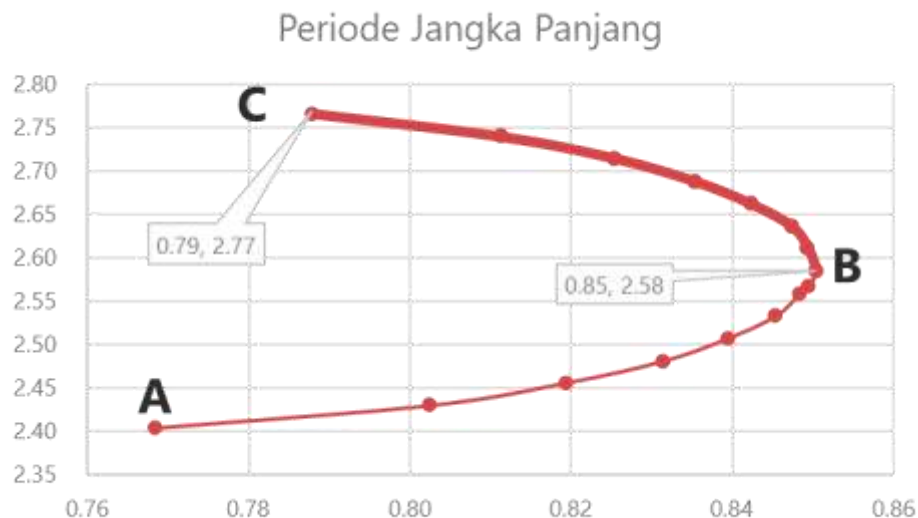
***Figure 4.** Efficient portfolio frontier corporate sukuk during the normal period*

Then Figure 4 illustrates all optimal portfolio combinations during the normal period starting from point A to point C. The combination of portfolios along the line from point B to point C has a level of risk which is the same as a portfolio that is along the line from point A to point B, but has a higher yield. So that the combination of portfolios that are along the line from point B to point C is the optimal portfolio combination because it provides higher returns at the same level of risk compared to portfolios that are along the line from point A to point B. So that during the normal period the portfolio optimal location is along point B which has a *return* of 2.53 with a standard deviation of 0.71 and point C which produces the *return* of 2.71 with a standard deviation of 0.65.

While Figure 5 depicts all optimal portfolio combinations over a long-term period starting from point A to point C. The combination of portfolios that are along the line from point B to point C has the same level of risk as portfolios that are along the line from point

A to point C. point B, but has a higher yield. So that the combination of portfolios that are along the line from point B to point C is the optimal portfolio combination because it provides higher returns at the same level of risk compared to portfolios that are along the line from point A to point B. the optimal portfolio length is along point B which has a *return* of 2.58 with a standard deviation of 0.85 and point C which produces the *return* of 2.77 with a standard deviation of 0.79.

Source: data processed by the author

Figure 5. *Efficient portfolio frontier for normal period corporate sukuk*

Based on the analysis of the *efficient portfolio frontier* in the three analysis time periods, it is known that the optimal portfolio of corporate sukuk in each measurement period shows that the higher *return*, the higher the risk that investors must accept. This is in accordance with sharia principles, namely *al ghunmu bi al ghurmi,* namely the profits obtained are always accompanied by risk and with a higher rate of *return* and also *al kharaju bi al dhomanah* which means that profits are morally acceptable only by taking the risk of losses (*gain a company's liability for loss*), if the profit is obtained without risk (Razief, 2011).

4.9 Optimal Portfolio Selection Based on Investor Category

After obtaining several optimal portfolios in several measurement time periods, then selecting the appropriate portfolio for each investor category in each measurement period. The mapping of the portfolio based on the risk preferences that investors are willing to accept can be seen in table 7, where in table 7 investors can be grouped based on the level of *return* and risk in each period, where in the 2014 – 2016 period investors with the *risk averse* are recommended to choose a portfolio that provides the lowest risk level of 0.48. At this risk level, investors will get a *return* of 3.88 where this portfolio consists of 0% *mudharabah* and 100% *ijarah* (48% SIISAT05 and 52% SIPPLN01CN1). Investors in the *risk lovers* are recommended to choose a portfolio that provides the largest rate of *return* , which is 4.03 and with *return* , investors will bear a risk of 0.66 where this portfolio consists of 0% *mudharabah* and 100% *ijarah* (100% SIPPLN01CN1). As for investors in the *risk neutral* is recommended to choose the optimal portfolio with a *return* of 3.89 and a risk of 0.49 where this portfolio consists of 0% *mudharabah* and 100% *ijarah* (44% SIISAT05 and 56% SIPPLN01CN1).

In the period 2016 – 2018 investors with the *risk averse* are recommended to choose

a portfolio that provides a risk level of 0.56, at this risk level investors will get a *return* of 2.57 where this portfolio consists of 52% *mudharabah* (100% BBMISMSB1CN2) and 48% sukuk *ijarah* (100% SIISAT05). Investors in the *risk lovers* are recommended to choose a portfolio that provides a *return* of 2.80 and with *return* investors will bear a risk of 0.77 where this portfolio consists of 100% *mudharabah* (100% BBMISMSB1CN2) and 0% *ijarah*. As for investors in the *risk neutral* is recommended to choose the optimal portfolio with a *return* of 2.71 and a risk of 0.65 where this portfolio consists of 81% *mudharabah* (100% BBMISMSB1CN2) and 19% *ijarah* (100% SIISAT05).

Table 7. Mapping of portfolios based on investor type

	Sukuk code	Crisis			period Normal			period Long-term period		
		Weight	ER	STDV	weight	ER	STDV	Weight	ER	STDV
Risk Averse	ADHISM1CN2	0%			0%			0%		
	BBMISMSB1CN2	0%	3.88	0.48	52%	2.57	0.56	49%	2.63	0.71
	SIISAT05	48%			48%			36%		
	SIPPLN01CN1	52%			0%			15%		
Risk Neutral	ADHISM1CN2	0%			0%			0%		
	BBMISMSB1CN2	0%	3.89	0.49	81%	2.71	0.65	85%	2.76	0.78
	SIISAT05	44%			19%			15%		
	SIPPLN01CN1	56%			0%			0%		
Risk Lovers	ADHISM1CN2	0%			0%			0%		
	BBMISMSB1CN2	0%	4.03	0.66	100%	2.80	0.77	100%	2.83	0.89
	SIISAT05	0%			0%			0%		
	SIPPLN01CN1	100%			0%			0%		

Meanwhile, in the period 2014 – 2018 investors with the *risk averse* are recommended to choose a portfolio that provides risk level of 0.56, at this risk level investors will get a rate *return* of 2.63 where this portfolio consists of 100% *mudharabah* (100% BBMISMSB1CN2) and 0% *ijarah*. Investors in the *risk lovers* are recommended to choose a portfolio that provides a *return* of 2.83 and with *return* investors will bear a risk of 0.89 where this portfolio consists of 49% *mudharabah* (100% BBMISMSB1CN2) and 51% *ijarah* (71% SIISAT05 and 29% SIPPLN01CN1). As for investors in the *risk neutral* is recommended to choose the optimal portfolio with a *return* of 2.76 and a risk of 0.78 where this portfolio consists of 85% *mudharabah* (100% BBMISMSB1CN2) and 15% *ijarah* (100% SIISAT05).

4.10 Managerial

Implications The managerial implications that can be given from the results of this study are intended for investors and issuers of corporate sukuk with the following details.

1. For investors, the research results are used as the basis for forming an investment portfolio in corporate sukuk instruments in various economic conditions. In *volatile* and uncertain economic conditions, such as the economic crisis, the preferred sukuk instrument is a sukuk with an *ijarah* because it provides *return* so that it has a lower level of risk than *mudharabah*, but in economic conditions that have improved and tend to be stable , investors can create investment portfolios by making allocations to *ijarah* sukuk and *mudharabah* according to their respective objectives, either to maximize *returns* or minimize risk.

2. For issuers, this research is expected to provide an overview of the characteristics of investors so that issuers can issue sukuk in accordance with investor preferences, so that later the value of corporate sukuk issuance can be greater.

V. Conclusion

The results showed that during the crisis period, sukuk with ijarah were superior both in risk and return compared to mudharabah, so that the optimal composition of the portfolio was to maximize the composition of the ijarah. However, in the post-crisis period (improvement of economic conditions) and long-term measurements, the optimal portfolio composition varies more depending on the objectives of each investor, either to maximize returns or to minimize risk. In addition, the research results also provide recommendations for optimal portfolios for various types of investors in terms of preferences for risk in various economic conditions. Of the three measurement time periods that describe various economic conditions, the optimal portfolio combination between sukuk mudharabah and sukuk ijarah is as follows: (1) 0%:100% for the period 2014 – 2016, (2) 81%:19% for the period 2016 – 2018 and (3) 85%:15% for the period 2014 – 2018.

References

[IBPA] Indonesia Bond Pricing Agency. 2018. Review Ekonomi Dan Pasar Obligasi Tahun 2018. [internet]. [diakses pada: 2019 Mei 13] tersedia pada: https://www.phei.co.id/Portals/0/Berita%20PHEI/Tinjauan%20Pasar%20Surat%20U tang%20Indonesia%202021.pdf?ver=Kwnl44cFjYtgeLmSRuZ0pA%3D%3D

[IFSB] Islamic Financial Services Board. (2018). Islamic Financial Services Industry Stability Report. [internet]. [diakses pada: 2019 Juli 22] tersedia pada: https://www.ifsb.org/preess_full.php?id=485&submit=more

[OJK] Otoritas Jasa Keuangan. (2018). Statistik Sukuk Korporasi Indonesia Maret 2018. Jakarta: OJK

Ascarya, Karim AA, & Anwar, E. (2013). Optimal Financing for Islamic Banking in Indonesia. Working Paper. 2-60.

Azifah N. (2015). Analisis risk dan return portofolio surat berharga syariah negara dan obligasi pemerintah periode 2010-2014 [tesis]. Jakarta (ID), Universitas Indonesia

Aziz, Musdalifah. (2013). Faktor-Faktor Yang Mempengaruhi Perilaku Investor Terhadap Return Saham Perusahaan Lq 45 Yang Terdaftar Di Bursa Efek Indonesia. Jurnal Fakultas Ekonomi. Universitas Hasanudin.

Benninga, S. (2000). Financial Modelling 2nd ed. Massachussets(US), Mit Press.

Bodi, K & Marcus. (2014). Manajemen Portofolio dan Investasi. Jakarta(ID), Salemba Empat.

Burhanuddin. (2013). Analisis Perbandingan Obligasi Syariah Mudharabah dan Ijarah di Bursa Efek Indonesia. Jurnal Fakultas Ekononomi. Universitas Hasanudin.

Devjak, S. (2004). Optimisation of the securities portfolio as a part of the risk management process. Journal of Management, 9(1):81-99.

Dewi, N. (2011). Mengurai masalah pengembangan sukuk korporasi di Indonesia menggunakan analytical networking process. Tazkia Islamic Finance and Business Review. 6(2):138-16.

Eling, M, Schuhmacher F. 2006. Does the choice of performance measure influence the evaluation of hedge funds?Working Paper. 29(1): 1-20.

Elton, EJ, Gruber, MJ, Brown, S., & William, NG (2003). Modern Portfolio Theory and

Investment Analysis. New Jersey(US), John Wiley & Sons, Ltd.

Endri. (2009). Permasalahan pengembangan sukuk korporasi di Indonesia menggunakan metode Analytical Network Process (ANP). Jurnal Keuangan dan Perbankan Pebanas, 13(3):359-372.

Husnan, S. (2014). Dasar-dasar Teori Portofolio dan Analisis Sekuritas. Yogyakarta(ID), UPP AMP YKPN.

Ismal, R. (2014). An optimal risk-return portfolio of islamic banks. Humanomics, 30(4): 286-303. https://doi.org/10.1108/H-08-2013-0055

Jones, CP & Jensen, GR (1994). Investments: Analysis and Management. New York(US), John Wiley & Sons Inc.

Jones, CP (2014). Investments Principles and Concepts. New York(US), John Wiley & Sons Inc.

Khairani, AB (2015). Analisis perbandingan kinerja kelas aset syariah dan portofolio syariah optimal dengan kinerja kelas aset konvensional optimal [tesis]. Bogor (ID): STEI Tazkia.

Kidd, D. (2011). The Sharpe Ratio and the information ratio. Virginia(US), CFA Institute.

Malik, AD (2017). Analisa faktor faktor yang mempengaruhi minat masyarakat berinvestasi di pasar modal syariah melalui bursa galeri investasi UISI. Jurnal Ekonomi dan Binis Universitas Internasional Semen Indonesia. 3(1).

Malik, M & Surya, BA. (2013). Optimal portfolio strategy of Indonesian government bond and foreign exchange using Markowitz efficient theory. Singapore (SG): Proceedings of 4th Asia-Pacific Business Research Conference.2013 September 31– Oktober 1; Singapura, Singapura. Singapura (SG) : World Business Institute, Australia and East Asia Institute of Management

Manurung, AH, & Tobing, WRL (2010). Obligasi (Harga portofolio dan Perdagangannya). Jakarta(ID), PT. Adler Manurung Press.

Markowitz, H. (1952). Portfolio selection. The Journal of Finance, 7(1): 77–91. https://doi.org/10.1111/j.1540-6261.1952.tb01525.x

Razief, NFD & Mohammad, S. (2011). Risiko-risiko dalam kewangan semasa: penilaian daripada perspektif Islam, International Conference Management (ICM) Proceeding.

Render, B., Stair, RM, & Hanna, ME (2012). Quantitative Analysis for Management. New Jersey(US), Prentice Hall.

Sharpe, WF (1994). The sharpe ratio. The Journal of Portfolio Management, 21(1): 49–58.

Suqaier, Faten, S., & Hussein, AZ (2011). The Effect of Diversification on Achieving Optimal Portfolio. European Journal of Economics Finance and Administration Sciences No. 32.

Tandelilin, E. (2010). Portofolio dan Investasi Teori dan Aplikasi. Yogyakarta(ID), Kanisius.

Tobin, J. (1958). Liquidity Preference as Behavior Towards Risk. The Review of Economic Studies, Ltd., 25(2), 65-86.

Triharyanto, RR (2013). Analisis portofolio optimal berdasarkan model indeks tunggal (Studi kasus: saham syariah di Bursa Efek Indonesia (BEI) [tesis]. Yogyakarta (ID): UIN Sunan Kalijaga.

Widoatmojo, S. (2005). Cara Sehat Investasi di Pasar Modal. Jakarta(ID), PT Jurnalindo Aksara Grafika.